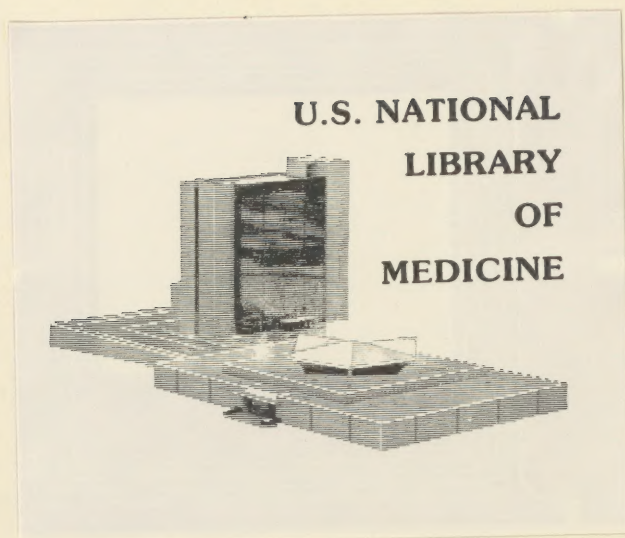


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CIRCULAR No. 2.

APPROVED PLANS AND SPECIFICATIONS

FOR

POST HOSPITALS.

U.S.

SURGEON GENERAL'S OFFICE,

Washington, July 27, 1871.

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WAR DEPARTMENT,
ADJUTANT GENERAL'S OFFICE,

Washington, D. C., November 23, 1870.

GENERAL ORDERS, No. 118.

The following regulations relative to hospitals for the army are published for the information of all concerned:

1. Regulation Hospitals will be of the plans this day approved, and will, when specially authorized by the Secretary of War, be erected at permanent posts. In the construction of a new post, the erection of the hospital shall go on *pari passu*, when practicable, with that of the storehouses and mens' quarters.

2. Provisionary Hospitals are such as are erected at temporary posts. In future no such building shall be erected or occupied for hospital purposes, until the opinion of a medical officer has been obtained in writing as to the merits of the site and arrangement; and if the Commanding Officer differ from this opinion he shall return the same to the medical officer with his reasons for so doing endorsed thereon.

3. Requests for the erection of Regulation Hospitals will be made by the medical officer through the Commanding Officer. The location of the building, the proposed material, the exact modifications of the regular plan, if any, which are proposed, and the estimated cost are to be stated in the request. The Commanding Officer will endorse his opinion upon the request and forward it to Department Head-quarters. The Department Commander will obtain the views of the Medical Director and Department Quartermaster and forward the papers to the War Department with his own opinion indorsed thereon.

4. When the erection of an hospital has been authorized, the officer charged with its construction, will consult as to minor details with the medical officer of the post, who will act as inspector of the work on the part of the Medical Department.

5. When the building is reported ready for occupation the medical officer will report in full as to its merits to the Surgeon General through the Medical Director, and shall furnish a copy of the same to the constructing officer.

6. Copies of all plans, estimates and orders connected with the erection or repairs of post hospitals, whether temporary or permanent, will be furnished to the Medical Department by the officer making the same, and when furnished to a post surgeon or a Medical Director they will at once forward them, with their comments to the Surgeon General.

7. The Surgeon General will in future furnish to the Quartermaster-General, in time for his annual estimates, a statement of the number and size of hospitals, and of the amount of hospital repairs, which will probably be required for the ensuing year, with the estimated cost of the same.

8. The plans and specifications for post hospitals approved this day will form the basis of action until further orders in regard to this subject.

BY ORDER OF THE SECRETARY OF WAR:

(Signed)

E. D. TOWNSEND,

Adjutant General.

WAR DEPARTMENT,

Washington, D. C., July 27, 1871.

The following plans and specifications for the erection of Post Hospitals are this day approved.

WM. W. BELKNAP,
Secretary of War.

CIRCULAR No. 2.

WAR DEPARTMENT,

SURGEON GENERAL'S OFFICE,

JULY 27, 1871.

The following plans and specifications, approved *this day* by the Secretary of War, are published for the information of Officers of the Army:

I. APPROVED PLAN FOR A REGULATION POST HOSPITAL OF 24 BEDS.—PLATES I AND II.

This hospital consists of a central administration building and two wards arranged as wings.

The wing for each ward will be 45 feet long, 24 feet wide and 15 feet high in the clear from floor to ceiling. For very cold climates the height may be reduced to 12 feet, in which case the length will be increased to 50 feet.

Attached to each ward, at the outer end and behind will be a room for the earth-closet, 9 feet square.

The administration building will be 35 feet front by 39 feet deep, and two stories high, with a back building, 40 by 14 feet. Each story of this building will be 12 feet high from floor to ceiling.

A veranda, 10 feet wide, will surround the hospital with the exception of the kitchen.

In hot climates the wards will be detached from the main building, only remaining connected with it by the veranda which will thus entirely surround the ward. The back building will be separated in like manner.

The plan of the first floor, the designations and dimensions of rooms, and the position of doors, chimneys, windows and beds are shown in Fig. 1, Plate I.

The plan and dimensions of the second floor are shown in Fig. 2, Plate I. The front and side elevations of the building are shown in Figs. 1 and 2, Plate II.

APPROVED PLAN FOR A REGULATION POST HOSPITAL OF 12 BEDS.

Designed especially for malarious regions and southern climates where it is desirable that the ward shall be on the second story.

This hospital will consist of a building two stories high, with a veranda extending entirely around the building, 10 feet wide.

The arrangement, designation, and dimensions of rooms, and the position of chimneys, doors, windows and beds are shown in Figs. 1 and 2, Plate III. The front elevation is shown in Fig. 3, Plate III.

A modification of the plan of a building of this class which may be adopted when deemed desirable is shown in Figs. 1 and 2, Plate IV. This form will have verandas similar to those shown in Plate III.

It is supposed that Regulation Hospitals will usually be built of wood, but brick or stone may be used when deemed more economical.

The following Form of Specifications for construction applies to a Regulation Post Hospital of 24 beds—
Plates I and II:

EXCAVATION.

*The excavations for piers, or trenches for footings, will be dug to sizes specified, made level, and well rammed on the bottom. The earth displaced will be deposited on the ground as may be directed.

MASON WORK.

The sills of the building and piazza will be supported on stone or brick piers or timber posts. If stone piers are used, they should be 2 feet by 1 foot 4 inches, built of large flat bedded stones, laid to break joints. If brick piers, they shall have a stone footing, 2 by 2 feet, and 6 inches thick; and the brick work shall be 18 by 18 inches, of sound hard burnt brick. In either case, the piers to be built in good lime mortar, composed of good strong lime and clean sharp sand. If wooden posts, they should be of cedar or locust, not less than 8 by 8 inches. The piers to be carried to a sufficient depth in the ground to secure from frost. The chimney flues shown on plan† will be built of good merchantable brick, of sizes in clear shown, thoroughly plastered inside, and provided with 6 inch earthenware or sheet iron thimbles, and tin caps to receive stovepipes where required. The chimneys above the roof will be built of hard burnt selected brick, with cap as shown.

CARPENTER WORK.

The frame will be a balloon frame, Sills 6 by 8 inches, all resting on stone or brick piers or timber posts, as above specified; two cross sills will be put to each ward, and the sills of the rear building will continue through the main building. All of the sills will be morticed, tenoned, and pinned to each other. The studs will be framed or notched into the sills, and together with the joists strongly and securely nailed to the sills with proper nails.

The studs for exterior walls will be notched at ends to fit into the sill mortice, and will be 2 by 6 inches, placed 16 inches from centres; doubled at all corners and openings, and well braced and bridged where necessary, being braced at the corners at least 5 feet up on the stud, and bridged over all openings. The joists of second floor will be carried on a ribbon, 1 by 4 inches, let into and strongly nailed to studs. Partition studs will be 2 by 4 inches, placed 16 inches from centres, strongly braced and bridged. All of the joists will be 2 by 10 inches, placed 16 inches from centres, strongly spiked to studs, and will have three rows of herring-bone 1 by 1½ inch bridging in the width of ward building, and one row in width of other spans. The ceiling joists will rest on a wall plate, spiked to the studs in two thicknesses of 2 by 4 inch stuff put on to break joints. The ceiling joists will be bridged as the floor joists are described to be.

The roof of the wards will be carried on principals placed as shown on section, constructed of 2 by 8 inch coupled principal rafters, 2 by 6 inch coupled tie beams, 3 by 6 inch straining pieces, 2 by 6 inch uprights (forming grounds for ventilator sides) and king-bolts of ¾ inch round iron, firmly secured by nuts and washers. Blocks, 2 inches thick, will be placed between principals, and ties at intervals of say 3 feet apart, well nailed: the straining piece will be dressed down to 2 inches thick where inserted between the ties and principal. Ceiling joists will be 2 by 4 inches, 16 inch centres; purlins will be 3 by 6 inches; rafters 2 by 6 inches, 2 feet centres—these rafters will be run over to form piazzas. The main roof will have 3 by 12 inch hips; rafters 2 by 6 inches, 2 feet centres; ceiling joist 2 by 6 inches, 16 inch centres. Rear building rafters will be 2 by 6 inches, 2 feet from centres, run over to cover piazzas; ceiling joist 2 by 6 inches, 16 inch centres. All of the roofs will be covered with rough boarding, 1 inch thick, and A No. 1 shaved shingles laid one-third to the weather; they will be cut to lap over on the hips, and the valleys and flashings will be tinned; hanging gutters will be put to all roofs, and conductors, 3 inches diameter, will convey the water to cistern connections. The ventilator on ridge will be constructed of 2 by 4 inch stuff, covered with shingles or rough boarding on outside, and lined with ½ matched tongued and beaded stuff to form inside ceiling.

*For Specification for Cistern see page 7.

† The plans referred to in these specifications are working drawings on a scale of ¼ inch and ⅛ inch to one foot respectively, a set of which will be furnished by the Surgeon General when required for actual use.

The piazza posts will be 6 by 6 inches, solid chamfered and stopped; the braces will be 4 by 4 inches; all framed together, and chamfered as shown on drawing. A 3 by 10 inch dressed piece will be gained into piazza posts, on which the piazza rafters will be notched.

All of the exterior walls will be rough boarded with inch boarding, well nailed, on which will be laid a covering of tar paper or felt, and finished with clear siding, each board lapped $1\frac{1}{2}$ inches on the other; corner boards will be put on double to each corner; a fascia board will be put under piazza roof. A base board, with cap, will be put all around building to receive siding. Cornice will be constructed of $\frac{7}{8}$ inch stuff.

Outside steps from ground to floor of piazza will have 2 inch strings and treads, with rounded nosing returned on ends; 1 inch risers resting on a stone flag raised above surface of earth. The first and second floors will be covered with inch tongued and grooved flooring not over 5 inches wide, of good quality, free from large or loose knots, shakes, or sap, dogged every fifth board, and firmly and secretly nailed. The floors of the piazzas will be covered with similar flooring $2\frac{1}{2}$ inches wide, put together with white lead and also secretly nailed.

All of the windows will be double hung; the pulley stiles will be $1\frac{1}{4}$ inches thick, sill $1\frac{1}{2}$ inches, face board 1 inch, and top piece rebated to receive weather boarding. Sash will be $1\frac{1}{2}$ inches thick, check rail glazed with No. 1 American single thick glass well sprigged and puttied. The frames will be furnished with parting strips, sash beads, $2\frac{1}{2}$ inch brass axle pulleys, cast iron round sash weights hung with best quality hemp cord. Bronze sash locks on the meeting rails, and all other appurtenances of the best description.

The exterior doors will be 3 feet by 7 feet 6 inches by $1\frac{3}{4}$ inches hung with $3\frac{1}{2}$ by $4\frac{1}{2}$ inch loose butt hinges, 3 hinges to each door. They will be provided with good mortice locks with brass bolts and springs, and brown mineral knobs and trimmings. Each door will be furnished with a round 4 inch brass slip bolt. The frames will be got out of $1\frac{1}{2}$ inch stuff, rebated for door, having beaded face board 1 inch thick: transom will be placed over each door, with sash divided in three lights, hung on swivels, and fastened with brass slip bolt. All doors will be four panelled O. G. on stiles and rails. Inside doors will be 3 feet by 7 feet by $1\frac{3}{8}$ inches, similar in all respects to doors above described, excepting that there will be no brass bolts in addition to the locks. The frames will be of inch stuff, having an O. G. stop $\frac{3}{4}$ thick by $2\frac{1}{2}$ inches wide, planted to receive door. Transoms will be as described above, excepting that they shall have no slip bolt.

All doors and windows shall have a molded casing, 5 inches wide, mitred around; the windows will have a plain stool and apron. Washboards will be run around each room let into a shoe; they will be 8 inches high O. G. on top. The stairs will be built on strong bearers having 1 inch beaded strings, $1\frac{1}{4}$ inch treads with rounded nosings, and scotia under: the risers will be $\frac{7}{8}$ inch thick, balusters will be turned $1\frac{1}{2}$ inches diameter of hard wood, and the rail will be $2\frac{1}{2}$ by $3\frac{1}{2}$ inches frog back. The whole will be set on strong bearers, and well put together. Turned hard wood stops will be put to washboards to prevent doors from striking the plaster.

Closets will be fitted up with shelves, strips and hooks; turned angle strips 6 feet high, will be put to all plaster arrises.

PLASTERING.

All of the walls and ceilings will be lathed, and will be two coat work hard finished in plaster of paris. The browning coat will be put on with good mortar composed of thoroughly slacked lime, clean sharp sand, and a plentiful supply of well beaten long winter ox-hair. The finishing coat will be composed of lime, putty, and plaster of paris exclusively, and will be well trowelled. All surfaces will be straight, plumb, and out of winding; angles and arrises of chimney's will be straight and plumb. The ventilator duct in wards, &c., and the ceilings of the piazzas will be lathed and plastered.

PAINTING.

The entire wood work usually painted inside and out will receive two coats pure white lead and pure boiled linseed oil. All knots and sap spots will be killed, and nail holes puttied. The second coat will be a good covering coat. The floors of the piazzas will have three coats pure boiled linseed oil and yellow ochre. All tin gutters and conductors and flashings will be painted two coats metallic paint.

II. SPECIFICATION OF LABOR AND MATERIAL TO BE USED IN THE CONSTRUCTION OF A POST HOSPITAL OF 12 BEDS.—PLATE III.

EXCAVATION.

The trenches for piers will be dug to the sizes shewn on drawings, properly levelled for footings; the sunk cistern to be dug to a depth of 16 feet and 18 feet in diameter; the earth to be filled in round piers and sunk cistern, well rammed, and the superfluous earth to be deposited on the ground as may be directed.

MASON WORK.

The sunk cistern will be built with the best burned hard brick and portland cement, 15 feet deep and 15 feet in diameter, walls 14 inches thick, bottom, 2 rows of brick on edge laid in cement and grouted with liquid cement, the top to be arched as a dome having man hole 2 feet 6 inches in diameter covered by a movable stone 3 by 3 feet by 4 inches thick; a hole to be left in top 3 inches in diameter for stem of pump.

The piers for supporting hospital (*if stone*) will be 2 feet by 16 inches thick of large flat bedded stones laid to break joints, (*if of brick*) to be 16 inches square of best hard burned sound brick, set on footings of stone 2 by 2 feet by 6 inches thick, depths as shewn on drawings.

The mortar for the building of piers of stone or brick to be composed of the best strong lime and clean sharp sand in proper proportions and thoroughly mixed together.

The chimney flues will be built of brick, sizes as shewn on plans, thoroughly plastered on inside and provided with 6 inch earthenware or sheet iron thimbles, and tin caps, to receive stove pipes when required. The chimneys above the roof will be built of hard burnt, selected brick with caps as shewn.

*CARPENTER WORK.

The frame will be a balloon frame, sills 6 by 8 inches. Studs to exterior walls to be 2 by 6 inches. Studs to inside partitions 2 by 4 inches. First and second floor joists 2 by 10 inches. Rafters and ties 2 by 8 inches, and dressed at eaves and over piazza, all to be 16 inches from centre.

The sills will rest on the piers and cross sill to be framed and pinned into longitudinal sill; the studs to be morticed into the sills with 2 by 2 inch mortices; the joists to be framed on to the sill or ribbon as the case may be, and to be strongly and securely nailed with proper nails, 16 inch centres.

The studs will be notched at ends to fit into the sill mortices, and will be placed 16 inches from centre to centre, doubled at all corners and openings and well braced and bridged when necessary, being braced at the corners at least 5 feet up on the stud, and bridged over all openings; the joists on the second floor to be supported by a ribbon 1 by 4 inches let into and strongly nailed to studs, all the joists will be strongly spiked to studs and will have 3 rows of herring bone bridging 1 by 1½ inches (3 rows in the width of main building) will be spiked to studs in 2 thicknesses of 2 by 6 inches put on to break joints, the ceiling joists will be bridged as floor joists are described to be, and suspended with 2 by 4 inch suspenders from rafters every 5th joist. The rafters will be placed 16 inches from centre to centre and continued over and from roof for piazza, that part of roof forming piazza will be dressed. The piazza posts will be 6 by 6 inches and rest on a hard wood plate 10 by 10 by 3½ inches; post to be dressed and stop chamfered, the rail at top to be 4 by 6 inches, the braces 4 by 4 inches, all chamfered as shewn on drawings. 3 by 10 inch bearers will rest on a continuous dressed piece 2 by 6 inches, strongly nailed to studs, and will also rest on piers and framed into posts, and will be securely fastened; on these 3 by 10 inch bearers will rest the 2 by 6 inch joists for piazza floors, placed 16 inches from centre to centre, notched on to bearers 2 inches and securely spiked; the second floor all dressed underneath. The handrail round the second floor piazza will be 3 by 4 inches framed into posts, the cross and upright pieces will be 2 by 3 inches morticed into handrail and bottom rail chamfered and framed as shewn on drawings.

All the exterior walls will be rough boarded with inch boarding well nailed, on which will be laid a covering of tar paper or felt, and finished with clear siding each board lapped 1½ inches on the other, corner

* If wooden posts are used for supporting balloon framing, &c., they should be of cedar or locust not less than 8 by 8 inches.

boards will be put on double to each corner. Face boards 8 by 10 inches wide having mold will be put at front of piazza floors. Plain face boards 13 and 17 inches wide at second floor of piazza and at wall plate of balloon frame, and cut between rafters. A base board will be put all round building to receive siding.

The first and second floors will be covered with inch tongued and grooved flooring not over 5 inches wide, of good quality, free from large or loose knots, shakes or sap, dogged every fifth board, and firmly and securely and secretly nailed. The floors of the piazza will be covered with similar flooring 2½ inches wide put together with white lead and also securely and secretly nailed. The roof will be covered with rough boarding and A No. 1 shingles laid one-third to the weather, cut and lapped on hips.

The ventilator on roof will be constructed of 2 by 4 inch stuff, covered with shingles on rough boarding on outside, and lined on bottom with dressed inch stuff, the duct or opening in ceiling will be 10 feet by 2 feet 6 inches, formed of 2 by 4 inch pieces nailed from ceiling joists to rafters, and lathed for plastering. A 2 by 3 inch rebated stop will be nailed on ceiling joists, along centre sides and ends of ventilating duct, to the centre piece will be hung 2 battened doors with all necessary ropes and pulleys to open and shut.

All of the windows will be double hung; the pulley stiles will be 1½ inches thick, sill 1½ inches, face board 1 inch and top piece rebated to receive weather boarding. Sash will be 1½ inches thick, check rail, glazed with No. 1 American thick glass, well sprigged and puttied. The frames will be furnished with parting strips, sash beads, 2½ inch axle pulleys, cast iron round sash weights hung with best quality hemp cord. Sash locks on the meeting rails, and all other appurtenances of the best description.

The exterior doors will be 3 feet by 7 feet 6 inches by 1¼, hung with 3 by 4½ inch loose but hinges, 3 hinges to each door. They will be provided with good mortice locks, with brass bolts and springs, and brown mineral knobs and trimmings; each door will be furnished with a round 4 inch brass slip bolt. The frames will be got out of 1½ inch stuff, rebated for doors, having beaded face board, 1 inch thick; transom will be placed over each door, with sash divided in 3 lights, hung on swivels, and fastened with brass slip bolts. All doors will be 4 panelled, O. G. on stile and rails. Inside doors will be 3 by 7 feet by 1½ inches, in all respects as above described, excepting that there will be no brass bolts on the doors in addition to the locks; the frames will be of 1 inch stuff, having an O. G. stop, ¾ inch thick and 2½ inches wide, planted to receive door; transoms will be as described above, excepting that they will have a stop on inside—they shall have no slip bolt.

All doors and windows shall have a 5 by 1 inch molded casing mitred around; the windows will have a plain stool and apron. Wash boards, 6 inches deep, molded, will be run round each room, let into a shoe.

Outside steps from ground to floors of piazza will have 2 inch strings and treads, with round nosings returned on ends, 1 inch risers, resting on a stone step. The stairs will be built on strong bearers, having 1 inch beaded strings, 1½ inch treads, with rounded nosings and Scotia under; the risers will be ¾ inch thick, the treads and risers strongly glued, blocked, and screwed together and on to bearers. Balusters will be turned 1½ inches thick of hard wood, and the rails will be 2½ by 3½ inches, frog backed, the whole will be well put together. The piazza stairs will have a rail similar to that round second story piazza. A step-ladder will be from landing of staircase inside to scuttle in ceilings, having 5 by 1½ inch side, and 1½ inch treads, 1 foot 6 inches wide over all. An iron ladder from top piazza to scuttle in roof, sides 2 by 2½ inches, and ½ inch round spokes, 14 inches wide over all.

Turned hard wood stops will be put to wash boards to prevent doors from striking plaster.

Closets will be fitted up with shelves, 2 rows molded hook rails, 1 by 4 inches, and hooks fixed 12 inches apart; turned angle strips, 6 feet high, will be put to all plaster arrises.

A cistern, out of 1½ inch dressed stuff, dovetailed and strongly put together with white lead, will be put over ceiling when directed, 5 by 5 by 2 feet deep, supplied by the pump in sunk cistern through 1½ inch pipe. A rough 1 inch gangway over ceiling, 3 feet wide, will be laid full length of roof.

Two scuttles in roof, of 1 inch batten, door 3 feet by 2 feet 6 inches, and 10 by 2 inch rebated frame, hung with backflap hinges and fastener complete. One scuttle in ceiling over landing of staircase, 2 feet 6 inches by 2 feet 6 inches, and 10 by 2 inch rebated frame, hung with backflap hinges and fastener complete. Roof and ceiling joists to be trimmed for the above scuttles.

PLASTERING.

All the inside walls and ceilings the sides of ventilating duct, will be lathed, and will be 2 coated, hard finished in plaster of paris. The browning coat will be put on with good mortar composed of thoroughly slacked lime, clean sharp sand and a plentiful supply of well beaten long winter ox-hair; the finishing coat will be composed of lime, putty, and plaster of paris exclusively, and will be well trowelled, all surfaces will be straight, plumb and out of winding, angles and arrises of chimneys will be straight and plumb.

The walls and bottom of sunk cistern will be coated with hydraulic cement and clean sharp sand $\frac{3}{4}$ ths of an inch thick, and trowelled clean.

TIN WORK.

The gutter at eaves will be 6 inches half round hung with iron brackets having 4 inch conductors, connected to 6 inch earthenware pipes conducting water to sunk cistern.

A 1½ inch pipe of lead will go from sunk cistern to cistern in roof; a force pump at sunk cistern will be provided for pumping water into cistern in roof. Tin flashing 10 inches deep to all chimneys, &c.; scuttles covered wholly with tin; a 20 by 8 inch galvanized iron ventilating pipe, for ventilation of ward, running between joists opening under floor of piazza, having 2 regulating register valves at ends of pipe.

PAINTING.

The entire wood work usually painted inside and out, will receive 2 coats of pure white lead and pure boiled linseed oil, all knots and sapwood will be killed and nail holes puttied. The second coat will be a good covering coat. The floors of the piazza will have three coats pure boiled linseed oil and yellow ochre, all tin gutters conductors and flashings will be painted 2 coats metallic paint.

The following points should also be embraced in the specifications—the precise mode in which they are to be stated depending on the circumstances of each particular case.

1. In all cases the ground floor must be raised 18 inches from the ground, and have free ventilation beneath it in warm weather. In warm climates and malarious regions the ground floor should be raised at least 3 feet above the ground, on piers or open arches.

2. A good cistern of suitable capacity is to be constructed and connected with the gutters and eavespouts of the roof. In northern climates, when the nature of the ground is suitable a good cellar, well drained and ventilated, is to be constructed under the kitchen.

3. The dispensary is to be neatly fitted with shelving, drawers and counter, and the storerooms with shelving, which for bedding and clothing will be open racks with slat bottoms.

4. The windows of the administration building, both above and below, will be furnished with outside shutters, and will be 7 feet high by 3 feet wide.

The windows of the isolation ward should be made secure with an iron grating—this room being intended to receive sick prisoners, cases of delirium tremens, etc.—when not in use for cases of low fever, etc. Cases of contagious disease, such as small pox, should be treated in hospital tents when the weather permits, and the isolation ward should not be used for such.

5. The dimensions given each room in the plans must be attained in the clear.

6. At posts where the mean temperature of the winter is liable to fall below 28° F., the ceiling of the ward being 12 feet from the floor, the windows will be double and 8 feet high by 3 wide.

7. The arrangements for ventilation of the wards will vary according to climate.

On the Gulf coast and in Arizona the wards will not be ceiled and will have ridge ventilation their whole length.

At all posts where continuous artificial heat is required for three months in the year the wards will be ceiled and have boxed openings carried from the center of the ceiling to the ridge for summer ventilation.

There will be two of these openings, each 10 feet long by $2\frac{1}{2}$ feet wide, and 10 feet apart. In winter the heating will be effected by a ventilating double fireplace the form of which is shown in Plate V.

It consists essentially of two open fireplaces, placed back to back in the centre of the ward, and enclosing an air-chamber between them. This air-chamber opens above into the ward by two pipes, controlled by registers, and communicates below with an air box, 18 inches square, which passes underneath the floor of the ward from side to side, and the ends of which open to the external air.

The pipe from this ventilating fireplace, 8 inches in diameter, passes up through a close fitting earthen tube or collar in the ceiling. One foot above the ceiling it enters a shaft or jacket about 24 inches in diameter which pierces the roof, and extending four feet above it is covered with a sheet-iron cap, which in its turn is pierced by the stove pipe, which will be capped in like manner. This shaft through which the stove pipe passes should be of clay or earthen-ware, but if a wooden shaft is used a sheet-iron tube, 18 inches in diameter, should intervene between the stove pipe and the wooden tube. At each end of the ward and two feet from the center will be an opening in the ceiling one foot square from which an air box will pass to a box enclosing the lower mouth of the tube surrounding the stove pipe. The heat of the pipe above the ceiling will thus create a continuous upward current in the surrounding tube, which will be supplied by the vitiated air from the ward through the air boxes.

The arrangements above described are shown in Plate VI.

A ventilating shaft, 6 inches square, will be placed in each earth-closet room, and the lamp or gas-burner of this room should be directly beneath this shaft. The chimney of the kitchen will be built with two flues, one of which will open near the ceiling and be used exclusively for ventilation.

8. The Surgeon General will indicate such modifications of this plan of ventilation as may seem desirable on account of locality, etc., when the plans for each hospital are submitted to him.

In hospitals built of brick, the wall will be 12 inches in thickness, built hollow, a space of not less than 3 inches being left between the inner and outer shells, which will be tied together at intervals of not less than 2 feet by bonders. The air chambers thus formed must be made as near air tight as possible by closing them at top and bottom and laying the brick carefully in full mortar.

9. In warm climates the privy and the dead-house should be small frame buildings detached from the hospital.

Other sizes of hospitals may be constructed, when approved by the War Department, by suitable lengthening of one or both wards.

Fig. 3, Plate IV, gives a ground plan for a Provisionary Post Hospital of 12 beds, to be constructed of logs, adobe or lumber, as the case may be, or as the circumstances may permit. This plan is given simply as a guide to be followed in cases which do not admit of delay, and for use of temporary encampments.

At all permanent posts established in future, a proper hospital will be constructed upon the plans given above for Regulation Post Hospitals.

J. K. BARNES,
Surgeon General.

The following estimates in detail of materials required for the erection of Regulation Post Hospitals are furnished as a guide for making out estimates of cost:

I ESTIMATE OF MATERIAL FOR A REGULATION POST HOSPITAL OF TWENTY-
FOUR BEDS. PLATES I AND II.

IF PIERS ARE OF STONE.

82 yards, cube, excavating.
56 " " stone in foundation.

IF PIERS ARE OF BRICK.

66 yards, cube, excavating.
9½ " " stone for footings, 6 inches thick.
24,000 bricks in piers.

IF PIERS ARE OF WOOD.

37 yards, cube, excavating.
126 pieces 4 feet by 8 by 8 inches—containing 2,688 feet of lumber.

REMAINING EXCAVATING.

197 yards, cube, excavating for flues and sunk cistern.
200 feet, lineal, 6 inch earthenware pipe for conducting rain water to sunk cistern—pipes laid to proper falls.

BRICKWORK, &C.

53,000 bricks for flues and for sunk cistern, circular on plan.
3,000 bricks for facings.
2 stone steps, 9 feet 6 inches long by 14 by 8 inches from ground to piazza.
1 stone flag, 3 by 3 feet by 6 inches, for covering man-hole of sunk cistern.

CARPENTER AND JOINER.

812 feet, lineal, 8 by 6 inch sill, in about 18 or 20 feet lengths, containing 3,248 feet of lumber.
304 studs, 2 by 6 inches, for outside wing walls, &c., about 16 feet long—4,864 feet of lumber.
137 studs, 2 by 6 inches, for outside walls of centre wing, about 28 feet long—3,836 feet of lumber.
1,835 feet, lineal, 2 by 6 inch top rails and braces to outside walls, containing 1,835 feet of lumber.
228 studs, 4 by 2 inches, 12 feet long, for inside walls on 1st and 2d floors, containing 1,824 feet of lumber.
903 feet, lineal, 4 by 2 inch head sill and brace, for inside walls, containing 602 feet of lumber.
4,814 feet, lineal, 10 by 2 inch joists, for 1st and 2d floors, in 10, 14, 26 and 36 feet lengths, containing 8,023 feet of lumber.
125 feet, lineal, 4 by 1 inch ribbon, for supporting ends of joists, containing 42 feet of lumber.
402 feet, lineal, cross bridging to joists, 16 inch centres.
2,618 feet, lineal, 4 by 2 inch ceiling joists, 16 inch centres, to wings about 25 feet long, containing 1,678 feet of lumber.

1,290 feet, lineal, 6 by 2 inch ceiling joists, 16 inch centres, to centre and rear buildings, containing 2,290 feet of lumber.
1,127 feet, lineal, 8 by 2 inch in couple sides, about 15 feet long, and ridge 95 feet long, and to centre roof couples 24 feet long, containing 1,503 feet of lumber.
8,398 feet, lineal, 6 by 2 inch tie beams, to wings 25 feet long, to ties of centre roof 36 feet long; for uprights and struts (short lengths), for all rafters to roofs, wings 26 feet long, and for framing of ventilators, containing 8,398 feet of lumber.
574 feet, lineal, 6 by 3 inch purlin to roofs, principals about 8 feet apart, containing 861 feet of lumber.
120 feet, lineal, 12 by 3 inch hips to centre roof, in 4 pieces, containing 360 feet of lumber.
318 feet, lineal, 8 by 2 inch hips, for shorter lengths to smaller roofs, containing 424 feet of lumber.
28 king bolts, for principals over wings, 3 feet 6 inches long, ¾ inch in diameter, heads, nuts and washers complete.
4 king bolts, for principals over centre building, 4 feet long.
386 feet, lineal, fascia and mold, 8 inches deep—258 feet of lumber.
386 feet, lineal, fascia and mold, 10 inches deep—322 feet of lumber.
352 feet, lineal, plain fascia, 13 inches deep—382 feet of lumber.
352 feet, lineal, plain fascia, 17 inches deep—499 feet of lumber.
354 feet, lineal, 2 by 6 inch continuous piece, supporting 10 by 3 inch bearers of piazza—354 feet of lumber.
55 posts, 12 feet 6 inches long, 6 by 6 inches, containing 2,062 feet of lumber—for veranda.
460 feet, lineal, 10 by 3 inch, for bearers, in 46 pieces in 10 feet lengths, containing 1,150 feet of lumber.
346 feet, lineal, 4 by 6 inch head, for veranda, containing 692 feet of lumber.
390 feet, lineal, in 74 pieces, braces, 4 by 4 inches, containing 512 feet of lumber.
7,700 feet, superficial, 1 inch tongued and grooved boarding, to first and second floors, 5 inches wide.
4,900 feet, superficial, 1 inch tongued and grooved boarding, for piazza, 2½ inches wide.
18,300 feet, superficial, 1 inch rough boarding, to walls and roof.
12,400 feet, superficial, 1 inch dressed siding, lap 1½ inches, for outside walls.
9,900 feet, superficial, tar paper, for outside walls.
84,000 shingles, for roofs.
144 feet, lineal, 2 by 3 inch wrot and rebated stop and middle rail, for hanging battened flaps to for regulating ventilation—72 feet of lumber.
100 feet, superficial, 1 inch stuff in 4 ventilating batten doors.
30 feet, superficial, 1 inch stuff in 4 scuttle doors; one in ceiling over landing over staircase, 2 feet 6 inches by 2 feet 6 inches, and 3 in roofs, 3 feet by 2 feet 6 inches.

52 feet, lineal, 2 by 10 inch rebated frames for scuttles.
 608 feet, lineal, 2 inch suspenders.
 1 wood ladder, 14 feet long, from landing to ceiling; sides 5 by $1\frac{1}{4}$ inches and $1\frac{1}{4}$ inch treads. 1 foot 6 inches wide.
 68 feet 8 inches, superficial, $1\frac{1}{2}$ inch wrot stuff for cistern in roof, 5 by 5 by 2 feet, and containing 103 feet of lumber.
 4,500 feet, superficial, 1 inch rough, for gangway over ceiling, 3 feet wide.
 162 feet, superficial, angle staves, for plaster angles.
 552 feet, superficial, 2 by 6 inch top rail for frame.
 2 flight of steps, from ground to piazza, having two treads, 9 feet 6 inches long; 1 inch risers, housed on to 2 inch strings, rounded noses and returned ends, all complete.
 4 single steps, from piazza to first floor; one 4 feet long, three 3 feet long; 1 inch risers, housed on to 2 inch strings, rounded noses and returned ends, all complete.
 1 stair, in 2 flights, 20 treads, from first to second floors, and having a landing; treads 3 feet 9 inches long, newel handrail and balusters, all complete.
 22 windows, box frames, check rails, sashes $1\frac{1}{2}$ inches thick, 12 lights, 22 by 18 inches, for wings.
 26 windows, box frames, check rails, sashes $1\frac{1}{2}$ inches thick, 8 lights, 18 by 16 inches.
 48 window stools and aprons; stools 4 feet 6 inches long by 6 by $1\frac{1}{4}$ inches, aprons 4 feet 6 inches by 6 by 1 inch, containing 360 feet of lumber.
 3,190 feet, lineal, 5 by 1 inch molded casings to doors and windows, both sides.
 1 outside door, (front), 4 panelled, O. G. mold on stiles and rails, 8 by 4 feet by $1\frac{3}{4}$ inches thick, transom light, divided into 2 panes, 22 by 20 inches, frames and molded transom, all complete.
 4 outside doors, 4 panelled, O. G. mold on stiles and rails, 7 feet 6 inches by 3 feet by $1\frac{3}{4}$ inches thick, transom light, divided into 2 panes, 22 by 16 inches, frames and molded transom, all complete.
 2 inside doors, 4 panelled, O. G. mold on stiles and rails, 8 by 4 feet by $1\frac{3}{4}$ inches, transom light in one, 44 by 12 inches, frames and molded transoms, all complete.
 16 inside doors, 4 panelled, O. G. mold on stiles and rails, 7 by 3 feet by $1\frac{3}{4}$ inches thick, transom light divided into 2 panes, 16 by 12 inches, frames and molded transoms, all complete.
 23 hard wood stops.
 465 feet, lineal, base mold, outside of building, containing 542 feet of lumber—the under piece 8 by $1\frac{1}{4}$ inches and the capping piece 3 by $1\frac{1}{4}$ inches.
 1,484 feet 6 inches, lineal, washboards, 6 inches deep, let into shoe. (O. G. mold.)
 378 feet, lineal, shelving for closets, 2 rows.

190 feet, lineal, 4 by 1 inch molded hook rails for closets, one row.

HARDWARE.

48 windows double hung with best hemp cord and cast iron weights, requiring about 500 yards of cord and about 2,256 lbs. of cast iron in weights.
 48 sash locks, for sashes.
 $34\frac{1}{2}$ pair of hinges, 3 inch, loose joint.
 23 mortice locks, for all doors.
 23 pair of brown mineral knobs.
 10 round, 5 inch, brass bolts to outside doors.
 5 springs for outside doors.
 23 pair of swivels for hanging transom lights.
 $18\frac{1}{2}$ dozen hat and cloak hooks, fixed to hook rails.
 12 pair of $2\frac{1}{2}$ inch backflap hinges for vent. doors, 3 on each.
 4 pair of hinges for scuttles.
 88 yards best hemp cord for opening and shutting doors of vents.
 12 screw pullies for cord to run on.
 4 fasteners for scuttles.
 4 hooks for fastening cord to in room.

PLASTERING.

2,621 yards, superficial, 2 coat lath and plaster to ceilings, walls, and inside of ventilators.
 104 yards, superficial, cementing, $\frac{3}{4}$ inch thick, for bottom and sides of sunk cistern.

TIN WORK.

327 feet, lineal, tin flashing to chimneys, &c., 10 inches deep.
 228 feet, lineal, tin gutters, 14 inches wide, to vallies.
 580 feet, lineal, 6 inch half round hanging gutters.
 204 feet, lineal, 4 inch conductors, taken to ground 12 stacks.
 50 feet, lineal, 20 by 8 inch galvanized iron ventilating pipe.
 4 register regulating valves fixed at outside of balloon frame.
 45 feet, superficial, tin covering to scuttles on roof.
 1 cistern pump.
 50 yards, lineal, $1\frac{1}{2}$ inch lead supply pipe from sunk cistern to cistern in roof.

PAINTER.

3,600 square yards 2 coat oil painting.

II. ESTIMATE OF MATERIAL FOR A REGULATION POST HOSPITAL OF TWELVE BEDS—

TWO STORIES HIGH. PLATE III.

IF PIERS, &C. ARE OF STONE.

44 yards, cube, excavating.
30 " " stone in foundations.

IF PIERS ARE OF BRICK.

44 yards, cube, excavating.
6 " " stone for footings, 6 inches thick.
16,200 brick in piers.

IF PIERS ARE OF WOOD.

23 yards, cube, excavating.
46 pieces, 3 feet 6 inches by 8 by 8 inches—858 feet board measure.

BRICKWORK.

53,000 bricks for flues and for sunk cistern, circular on plan.
2,700 bricks for facings.
1 stone step, 7 feet by 14 by 8 inches from ground to piazza.

EXCAVATING.

192 yards, cube, for sunk cistern.
100 yards, lineal, 6 inch earthenware pipe for conducting water to sunk cistern—pipes laid to proper falls.
1 stone flag, 3 by 3 feet by 6 inches, for covering man-hole of sunk cistern.

CARPENTER.

286 feet, lineal, 8 by 6 inch sill, in about 18 or 20 feet lengths, containing 1,147 feet of lumber.
202 studs, 2 by 6 inches, for outside wall, about 28 feet long—5,656 feet of lumber.
416 feet, lineal, 2 by 6 inch top plate, containing 278 feet of lumber—2 inches in depth.
291 studs, 12 feet long, 4 by 2 inches, for first and second floor—2,262 feet of lumber.
670 feet, lineal, 4 by 2 inch head and sill, containing 446 feet of lumber.
1,086 feet, lineal, 4 by 2 inch braces, one row in each story—724 feet of lumber.
118 joists, 10 by 2 inches, in first and second floors in 26 feet lengths—5,113 feet of lumber.
308 feet, lineal, cross bridging joists, 16 inch centres.
308 feet, lineal, 4 by 1 inch ribbon for ends of joists, containing 103 feet of lumber.
200 rafters, 26 feet long, 8 by 2 inches, containing 6,933 feet of lumber.
61 tie beams, 30 feet long, 8 by 2 inches—2,440 feet of lumber.
54 feet, lineal, 8 by 2 inch ridge—72 feet of lumber.
4 hips, 34 feet long, 12 by 3 inches—408 feet of lumber.
46 posts, 24 feet 6 inches long, 6 by 6 inches, containing 3,381 feet of lumber—for veranda.
795 feet, lineal, 10 by 3 inch bearers, in 84 pieces—1,987 feet of lumber.
3,936 feet, lineal, 6 by 2 inch joists, in 7 feet lengths—3,936 feet of lumber.

576 feet, lineal, 4 by 6 inch stop chamfered piece, in 7 feet lengths—1,152 feet of lumber.
142 braces, 3 feet 3 inches long, 4 by 4 inches, containing 615 feet of lumber.
88 feet, lineal, 2 by 3 inch cross brace, in 32 pieces, 2 feet 9 inches long—44 feet of lumber.
284 feet, lineal, 4 by 3 inch handrail on piazza, in 7 feet lengths—284 feet of lumber.
782 feet, lineal, 2 by 3 inch crossframe work, in 3 feet 6 inch lengths—391 feet of lumber.
290 feet, lineal, fascia and mold, 8 inches deep—193 feet of lumber.
290 feet, lineal, fascia and mold, 10 inches deep—241 feet of lumber.
208 feet, lineal, plain fascia, (no mold), 13 inches deep—225 feet of lumber.
208 feet, lineal, plain fascia, (no mold), 17 inches deep—295 feet of lumber.
210 feet, lineal, 2 by 6 inch continuous piece, supporting 10 by 3 inch bearers of piazza—210 feet of lumber.
210 feet, lineal, 2 by 6 inch lintel.
625 feet, lineal, 4 by 2 inch stuff in ventilator; uprights 8 feet long; rails 54 feet long; hips 4 feet long; containing 417 feet of lumber.
4,900 feet, superficial, 1 inch tongued and grooved boarding to first and second floors, 5 inches wide.
3,100 feet, superficial, 1 inch tongued and grooved boarding, 2½ inches wide, for piazzas, 5 inches wide.
7,300 feet, superficial, 1 inch tongued and grooved boarding for wrot siding, 1½ inch lap.
10,300 feet, superficial, 1 inch tongued and grooved boarding, rough, for roofs and walls, 1½ inch lap.
5,900 feet, superficial, tar paper for walls.
44,000 shingles for roofs.
90 feet, lineal, 2 by 3 inch wrot and rebated stop and middle rail, for hanging batted flaps to for regulating ventilators—45 feet of lumber.
55 feet, superficial, 1 inch stuff, in 2 ventilating batten doors.
23 feet superficial, 1 inch stuff, in 3 scuttles, one in ceiling over landing of staircase, 2 feet 5 inches by 2 feet 6 inches, and 2 in roofs, 3 feet by 2 feet 5 inches.
39 feet, lineal, 2 by 10 inch rebated frame for scuttles.
68 feet, superficial, 1½ inch wrot stuff, for cistern in roof, 5 by 5 by 2 feet, and containing 103 feet of lumber.
234 feet, superficial, 1 inch rough, for gangway over ceiling, 3 feet wide.
1 step ladder, 16 feet long, of wood, stiles 5 by 1½ inches, and 1½ inch treads, 1 foot 6 inches wide over all, 168 feet angle stave for plaster.
1 flight of steps, from ground to piazza, having 2 treads, 7 feet long; 1 inch risers, housed on to 2 inch strings rounded noses and returned ends, all complete.
6 single steps from piazzas to floors; treads 3 feet 6 inches long; 1 inch risers, housed on to 2 inch strings, rounded noses and returned ends, all complete.
1 straight flight of stairs, from one piazza to another, in 20 treads, 2 feet 9 inches long, having molding under nose, 1 inch risers, 4 newels, handrails and balusters on each side of flight and round landing, all complete.

- 1 stair, in 2 flights, 21 treads, from first to second floor, and having a landing; newel, handrail and ballusters, all complete.
- 12 windows, box frames, check rails; sashes $1\frac{1}{2}$ inches thick; 12 lights, 20 by 10 inches, for first floor.
- 13 windows, box frames, check rails; sashes $1\frac{1}{2}$ inches thick, 18 lights, 20 by 10 inches, for second floor.
- 25 window stools and aprons; stools 4 feet 6 inches by 6 by $1\frac{1}{4}$ inches; aprons 4 feet 6 inches by 6 by 1 inch, containing 126 feet of lumber.
- 2,339 feet, lineal, 5 by 1 inch molded casing to doors and windows, both sides.
- 6 outside, 4 panelled doors, O. G. mold on stiles and rails 7 feet 6 inches by 3 feet by $1\frac{3}{4}$ inches thick; transom light divided into 3 panes, 29 by 10 inches; frames and molded transoms, all complete.
- 17 inside, 4 panelled doors, O. G. mold on stiles and rails, 7 by 3 feet by $1\frac{3}{8}$ inches thick; transom lights divided into 3 panes, 20 by 10 inches; having frames and molded transoms, all complete.
- 23 hard wood stops, for doors.
- 209 feet, lineal, base mold, outside of building, containing 244 feet of lumber—the under piece 8 by $1\frac{1}{4}$ inches and the capping 3 by $1\frac{1}{4}$ inches.
- 1,083 feet, lineal, washboards, 6 inches deep, let into shoe. (O. G. mold.)
- 185 feet, lineal, shelving for closets, 2 rows.
- 198 feet, lineal, 4 by 1 inch molded hook rails for closets, one row.

HARDWARE.

- 25 windows double hung with best hemp cord and cast iron weights, requiring about 269 yards of cord and about 1,490 lbs. of cast iron in weights.
- 25 sash locks, for sashes.
- $34\frac{1}{2}$ pair of hinges, 3 inch, loose joint.
- 23 brass mortice locks, for outside doors.
- 23 pair of brown mineral knobs.
- 12 round 4 inch brass bolts to outside doors and transom lights.

- 6 springs for outside doors.
- 23 pair of swivels for hanging transom lights.
- 16 $\frac{1}{2}$ dozen hat and cloak hooks, fixed to hook rails.
- 6 pair of $2\frac{1}{2}$ inch backflap hinges for ventilating doors, 3 on each.
- 3 pair of hinges for scuttles.
- 44 yards of best hemp cord for opening and shutting ventilating door.
- 6 screw pullies for cord to run over.
- 3 fasteners for scuttles.
- 2 hooks for fastening cord to in room.

PLASTERING.

- 1,944 yards, superficial, 2 coat lath and plaster to ceilings, walls, and inside of ventilators.
- 104 yards, superficial, cementing, $\frac{3}{4}$ inch thick, for bottom and sides of sunk cistern.

TIN WORK.

- 49 feet, lineal, tin flashing to chimneys, 10 inches deep.
- 288 feet, lineal, tin, 6 inch, half round hanging gutters.
- 150 feet, lineal, tin, 4 inch conductor, taken to ground 6 stacks.
- 26 feet, lineal, 20 by 8 inch galvanized iron ventilating pipe.
- 2 register regulation valves, fixed at outside of balloon frame.
- 45 feet, superficial, tin, covering scuttles on roof.
- 1 cistern pump.
- 50 yards, lineal, $1\frac{1}{2}$ inch lead pipe, from sunk cistern to cistern in roof.
- 1 iron ladder, 16 feet long, 14 inches wide, sides 2 by $\frac{1}{2}$ inches, steps $\frac{1}{2}$ inch diameter.

PAINTER.

- 7,891 yards, superficial, 2 coat oil painting.

PLAN for a POST HOSPITAL of 24 Beds.

Scale, 20 ft to one inch.

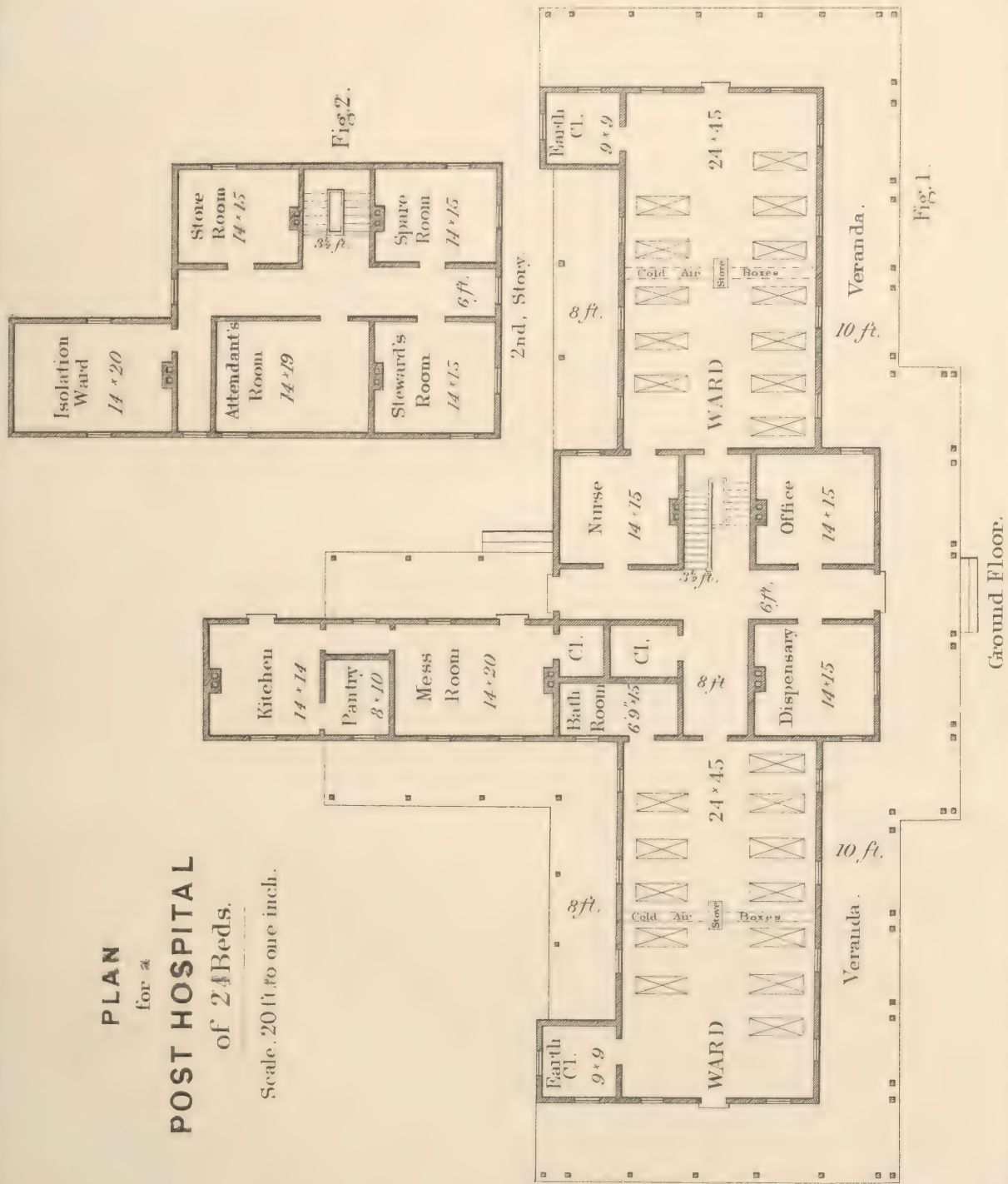
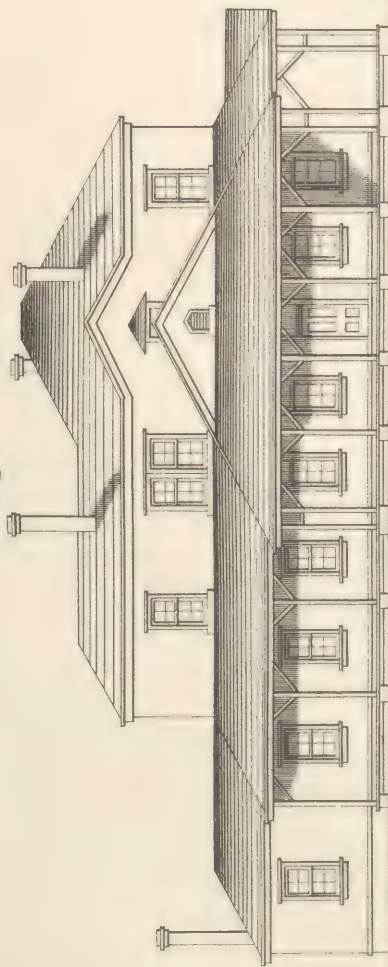
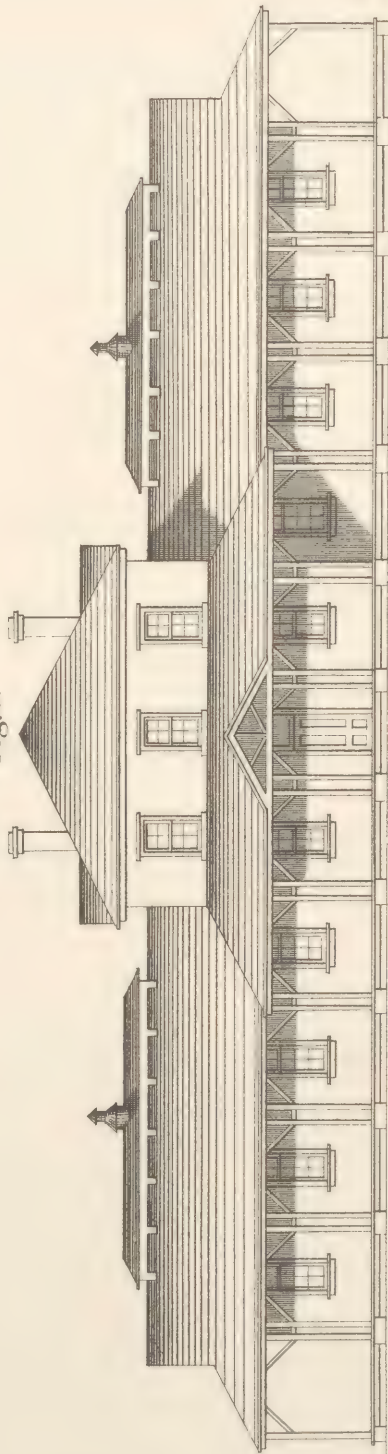


Fig. 2.



SIDE ELEVATION.

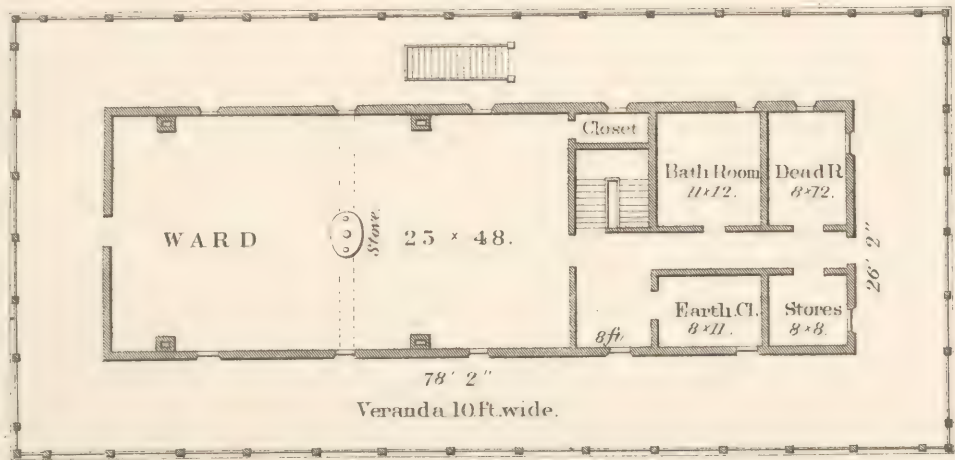
Fig. 1.



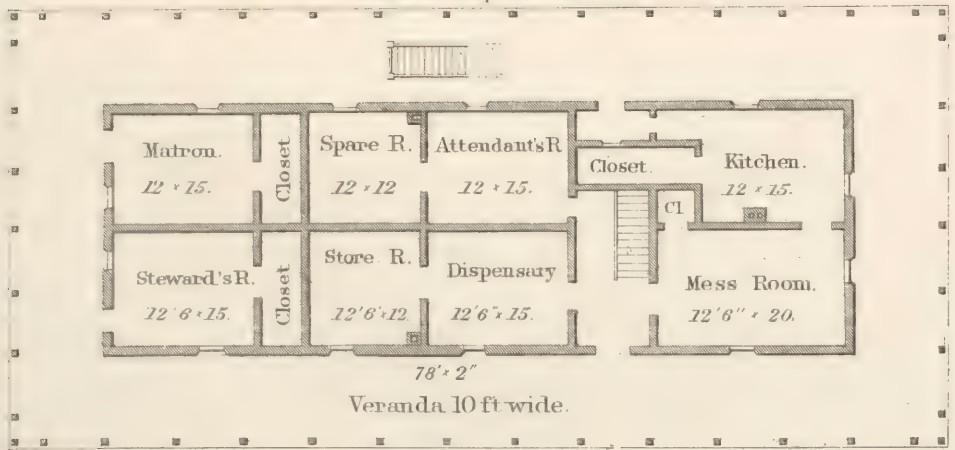
FRONT ELEVATION.



Front Elevation.



Second Story Plan.

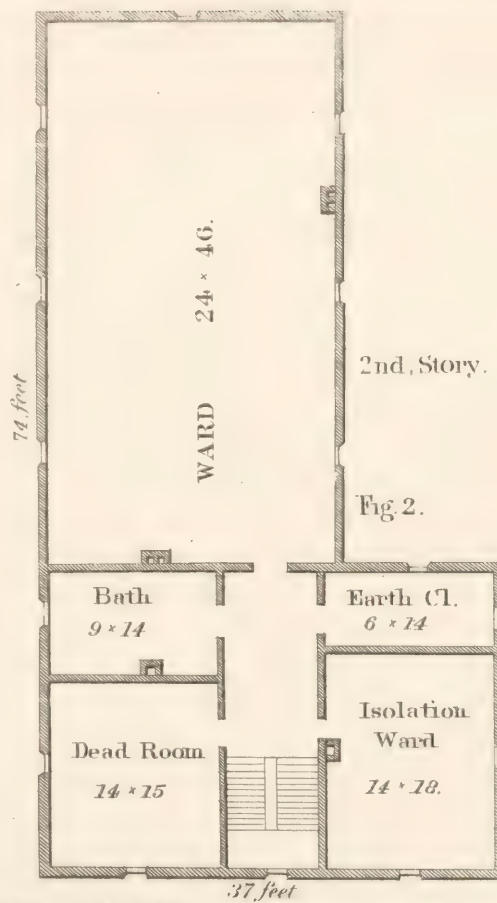


First Story Plan.

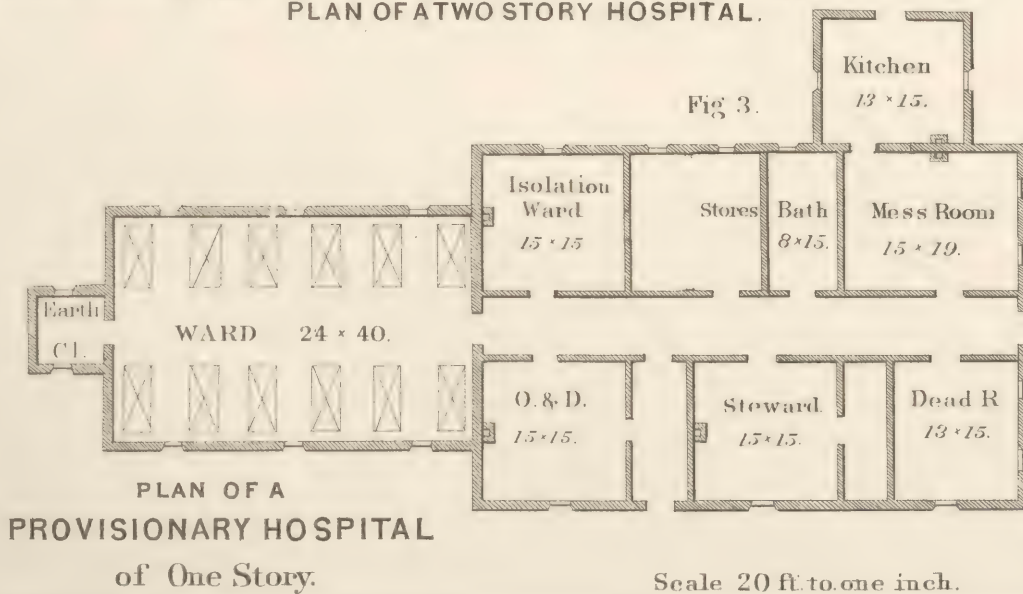
PLAN OF A TWO STORY POST HOSPITAL.

with Ward on 2nd. Floor.

Scale 20 ft. to one inch.

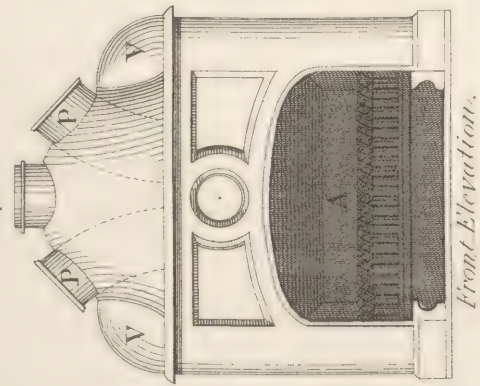


PLAN OF A TWO STORY HOSPITAL.



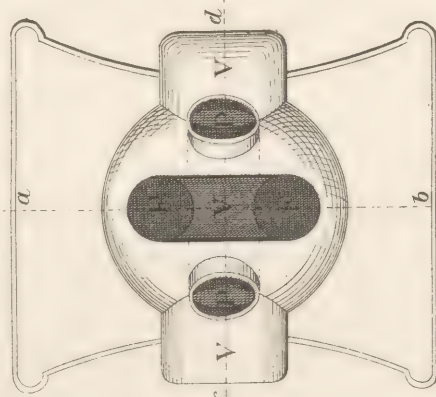
Scale 20 ft. to one inch.

Fig. 1.



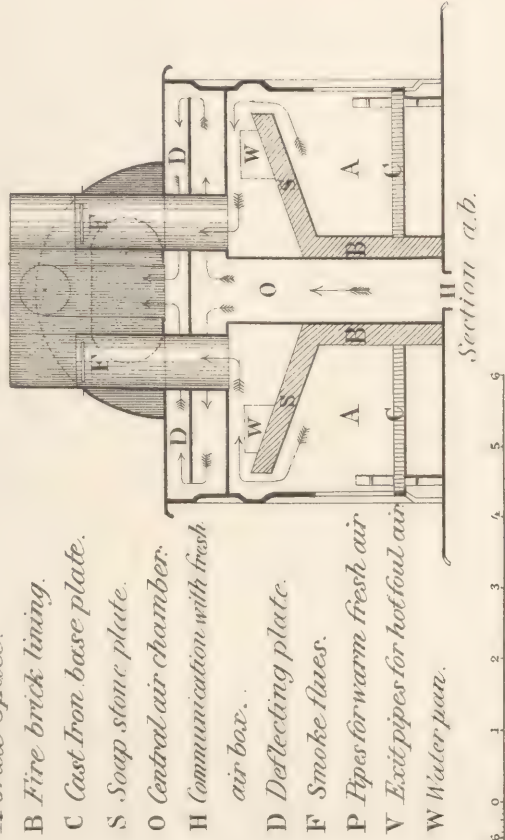
Front Elevation.

Fig. 3.



Top View.

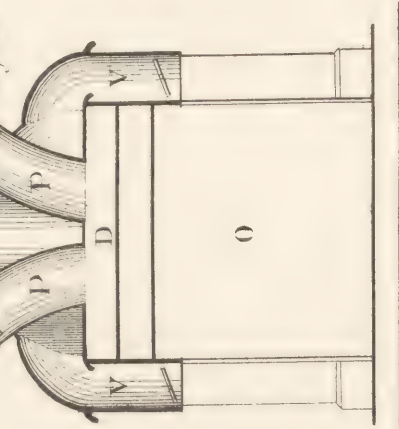
Fig. 2.



Section a.b.

0 1 2 3 4 5 6
Feet
0 1 2 3 4 5 6
Inches
Scale: 3/8 inch to one foot.

Fig. 4.



Section c.d.

VENTILATING FIREPLACE.

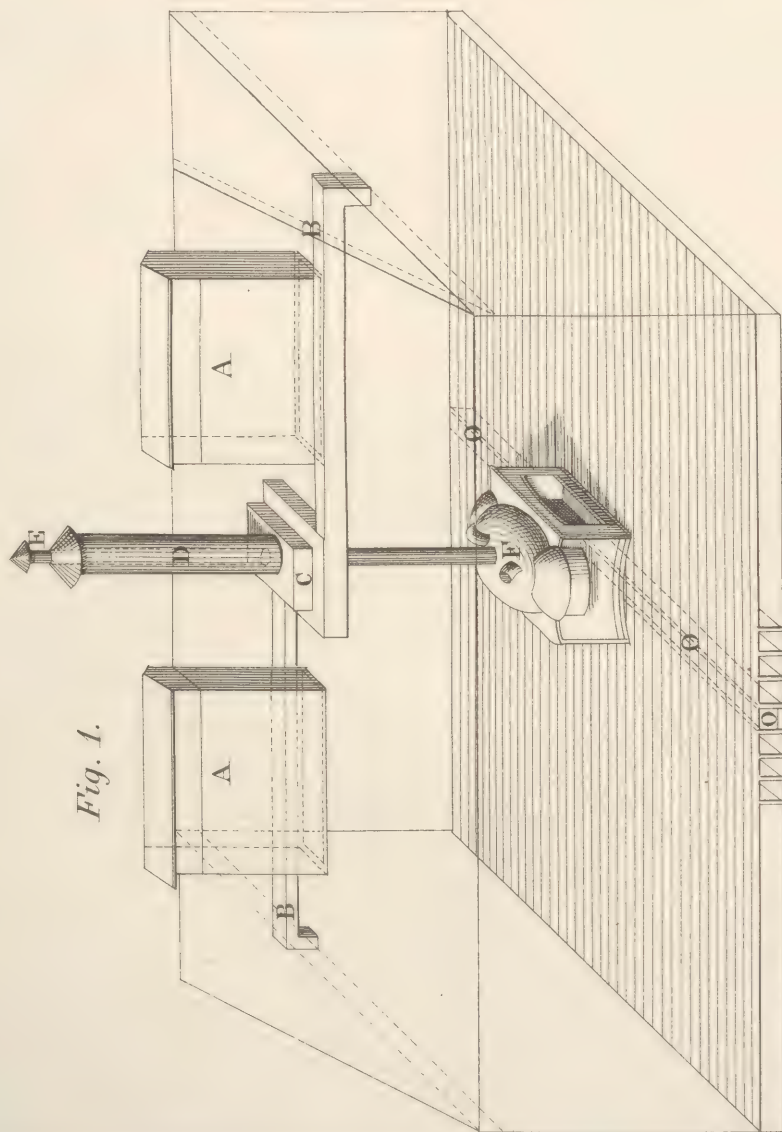


Fig. 1.

VIEW OF WARD SHOWING VENTILATION.

A. A. Air Boxes for Summer ventilation. C. Box, into which Boxes BB. open.
 B. B. " " Winter ventilation. D. Ventilating Shaft.
 E. Stove Pipe. F. Fire Place. O. Fresh Air Box.

Scale: 12 feet to 1 inch.

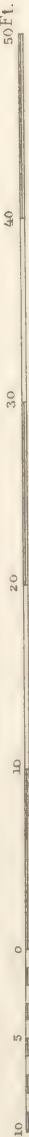


Fig. 3.

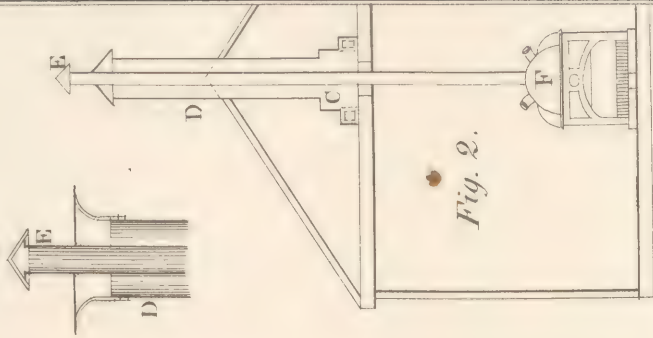
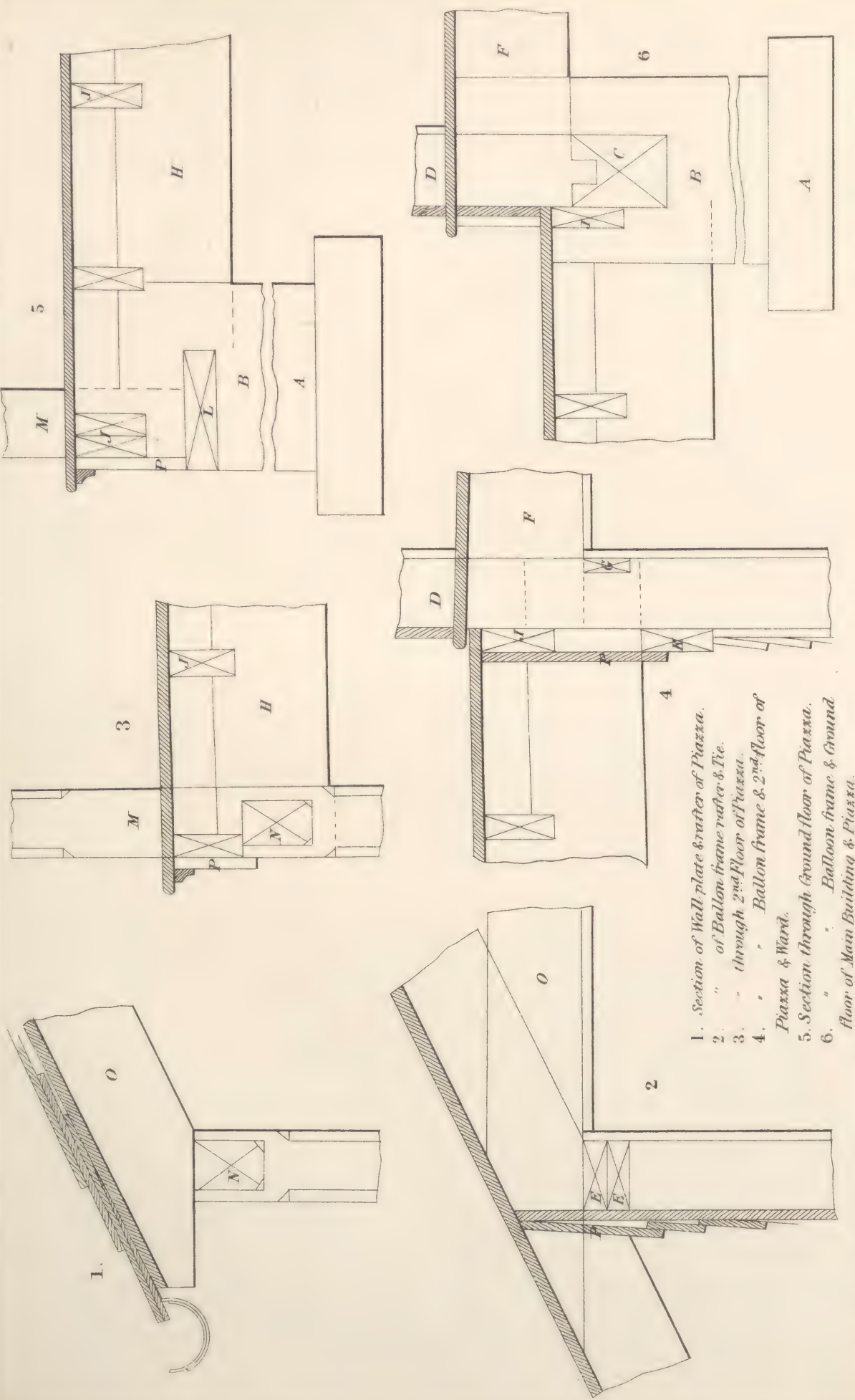


Fig. 2.

**TRANSVERSE SECTION
OF WARD.**





- A. 2'0" x 2'0" Stone footings.
- B. 16" x 16" Brick Piers.
- C. 6" x 8" Sil.
- D. 2" x 6" Studs.
- E. No 2 2" x 6" Lintel.
- F. 2' 10" Joists.
- G. 1' x 4" Ribbon.
- H. 3' 10" bearer for Piazza.

DETAILS OF BALLOON FRAME for

U.S.A. REGULATION POST HOSPITAL.

This Plate is designed more especially to show some of the details of construction of a Two
Story Post Hospital of 72 Beds. (Plate III) but contains also details of construction of a Two
Story Post Hospital of 120 Beds. (Plate IV)

- J. 2" x 6" Joists for Piazza.
- K. 2" x 6" continuous bearer
- L. 10' 10" 3 1/2" Plate
- M. 6" x 6" Piazza Post.
- N. 4" x 6" Piazza Rail.
- O. 2' 8" Rafter & Tie.
- P. 1" Fascia.



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